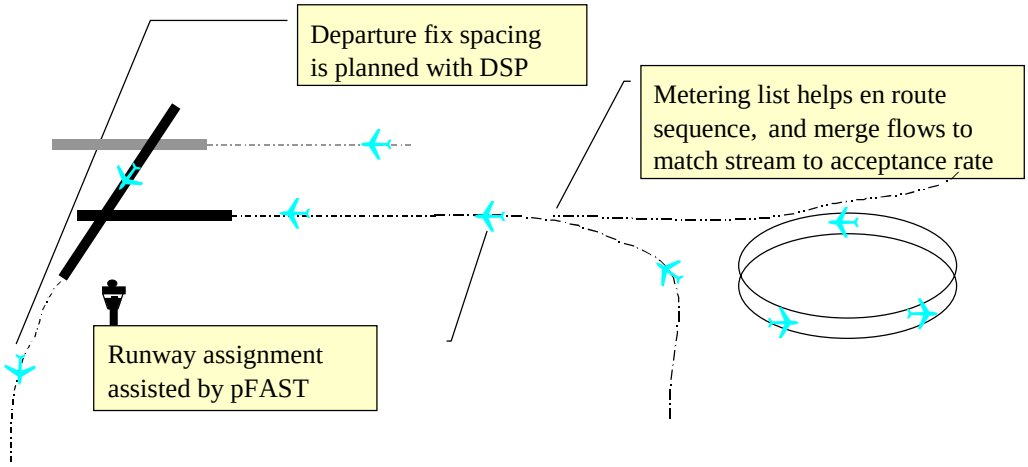
AD-4: Fill Gaps in Arrival and Departure Streams

Improved planning information through use of decision support tools.



Background

During periods of high traffic demand, realizing the full potential throughput at an airport requires the controller to space aircraft at the minimum required for safety. At most locations, controllers rely on experience and their ability to extrapolate the future position of aircraft to develop spacing plans and to execute these plans. Research on automated decision support tools has shown that controllers can improve their planning, which results in improved throughput.

Ops Change Description

Controllers and TMCs will have improved information on arrival and departure demand and on available capacity. Decision support tools will assist them in developing improved sequencing. These plans will reflect an improved ability to project the future position of the aircraft, to optimize use of runways and fixes, and to account for separation requirements based on aircraft weight classification. The result will be an improved balancing of the airport runway assets and an increase in the airport throughput rate for both arrivals and departures. In addition, the execution of the plan will be improved through the provision of tools that show controllers the delay required for each aircraft. Arrival metering will transition from being mileage based to being time based.

- AD-4.1: *Departure Spacing*—The Departure Spacing Program (DSP) will improve the sequencing of aircraft from multiple airports over common departure fixes and will reduce departure delays. DSP will also provide a means to apportion departure delays among participating facilities and flights, based on determinations made by TMCs of the most advantageous TFM operational scenario for the predicted traffic and weather conditions. Initial DSP capabilities are already available for New York airports.
- AD-4.2: *Metering and Merge Planning*—Traffic Management Advisor – Single Center (TMA-SC) will provide a metering plan to TMCs and provide information to controllers to quantify the differences between assigned meter times and the times that aircraft are

projected to cross a meter fix. A planned enhancement to TMA, Traffic Management Advisor – Multi Center (TMA-MC) will support metering at airports that are near center boundaries or where the arrival flows may interact with the flows to other airports.

- AD-4.3: *Runway Allocation and Spacing*—The passive Final Approach Spacing Tool (pFAST) will provide terminal controllers and TMCs optimal runway assignments for arrivals.

Benefits, Performance and Metrics

- DSP will reduce the coordination time necessary for departures in complex airspace and during severe weather situations, and will result in reduced departure delays.
- Due to improved information from TMA to TMC's and controllers, arrival rates will increase 5-10 percent. Estimated improvements are based on results from implementation at ZFW-DFW.
- Due to runway advisories from pFAST, runways will be better balanced, resulting in an estimated increase in total operations throughput of more than 3 percent.

AD-4.1 Departure Spacing

DSP will provide Tower, TRACON, and Center controllers and TMCs with information on departures. This information will include routes, aircraft status, and departure timeframes.

Scope and Applicability

- DSP will improve the sequencing of aircraft from multiple airports over common departure fixes and will reduce departure delays.
- DSP will initially focus on New York/New Jersey airports (including PHL), then on Boston and Washington area airports in FY 02. DSP will be applicable in the Northeast corridor of the United States, where multiple airports share oversubscribed departure fixes and routes.
- In parallel, the NASA will be developing a controller decision support tool for expedite departure path planning (EDP) to assist the controller in precisely meeting DSP flow rates over departure fixes and, where possible, to merge departures directly into en route streams.

Key Decisions

- None identified.

Key Risks

- None identified.

AD-4.2 Metering and Merge Planning

Decision support tools provide the TMC with a metering plan and the controller with information on the required delays for each aircraft (also see ER-7.2).

Scope and Applicability

- TMA (Traffic Management Advisor) is applicable for airports where arrival demand regularly exceeds capacity.
- TMA-SC (Traffic Management Advisor – Single Center) near-term and mid-term locations include: ZFW-DFW (complete), ZMP-MSP (complete), ZDV-DEN (complete), ZMA-MIA (FY01), ZOA –SFO (FY01), ZLA-LAX (in initial daily-use), ZTL-ATL (FY01), and ZAU-ORD (FY02).
- Additional arrival sites will require site specific adaptation. FFP2 plans to deploy TMA-SC to support arrivals at the following airports: ZME-MEM, ZKC-STL, ZID-CVG, and ZHU-IAH. Deployment order and schedule have not been finalized, but the current plan is to deploy to 1 site in FY 03, 2 sites in FY04, and 1 site in FY 05. Expansion to additional sites may include supporting arrivals to MCO, CLT, SEA, SLC, PHX, and LAS.
- TMA-MC (Traffic Management Advisor –Multi Center) will enhance TMA to work in areas where the airport is close to the center boundaries and where arrival flows interact with flows to other airports. RTCA recommended TMA for several sites that require TMA-MC capability, these include Washington area airports, N90 airports, PHL, DTW, SDF, BOS, and PIT. NASA is developing TMA-MC with emphasis on PHL airspace; this capability should be ready for evaluation in FY 03.
- In parallel, research is also ongoing as part of the Safe Flight 21 program to develop an application that enables more optimal spacing by providing pilots with advisories on airspeeds needed on final approach to maintain spacing objectives and increase efficiency.

Key Decisions

- Priorities for TMA deployments beyond the current recommendations.

Key Risks

- NASA is currently researching TMA-MC. Implementation is dependent on the success of this research and on NASA participation in technology transition.
- New York and Philadelphia redesign activities will result in changes to TMA adaptation and therefore work in these areas needs to be coordinated.

AD-4.3 Runway Allocation and Spacing

pFAST will provide the controller with runway assignments for arrival aircraft.

Scope and Applicability

- pFAST is applicable at airports with multiple arrival runways and that at peak times are at or near capacity. Applicability and benefits depends on airline schedules and airport configuration.
- pFAST near-term and mid-term locations include: DFW (complete), LAX (complete), ATL (FY01), MSP (FY01), STL (FY02). Capability depends on ARTS IIIe or STARS availability for full implementation. Partial benefits may be achieved with current equipment.
- Further implementation of pFAST will be contingent upon infrastructure waterfalls (e.g., STARS). Implementation will be consistent with, and will need to be coordinated with airspace modifications for San Francisco area, Washington area, and New York area airports.
- In parallel, the NASA will be conducting research to add heading and speed advisories to pFAST in order to assist the controller in precisely spacing the aircraft in the arrival stream.

Key Decisions

- Priorities for pFAST deployment beyond the current RTCA recommendations.

Key Risks

- pFAST requires a significant amount of site specific adaptation (pFAST is adapted to reflect how arrivals actually fly in the terminal airspace). Therefore pFAST site specific schedules must be coordinated with other expected changes at the same locations. These changes include modifying airspace, expanding the area in which 3 nmi separation applies, changing arrival routes, and adding new runways.
- To achieve full benefits from pFAST, controllers may need to change their current local operating practices.
- STARS deployment waterfall is uncertain.